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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,915	04/12/2004	Takaharu Yamano	300.1152	2431

21171 7590 07/13/2006

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EXAMINER

VU, HUNG K

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 07/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/821,915	Applicant(s) YAMANO ET AL.	
	Examiner Hung Vu	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claim 1 is objected to because of the following informalities:

In claim 1, line 11, “lowermost layers” should be changed to “lowermost semiconductor device” for clarity.

In claim 1, last line, “the wafer” should be changed to “the lowermost semiconductor device”, for clarity.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1 and 3-8 are rejected under 35 U.S.C. 102(a) as being anticipated by Tsai et al.

(PN 6,713,856, of record).

Tsai et al. discloses, as shown in Figures 2-3, a semiconductor package, wherein

the semiconductor package (10) is a stacked body formed by bonding two or more semiconductor devices (20&34,56&58) through an insulating layer (30,60);

each of the semiconductor device comprising a substrate and a device pattern formed on a surface thereof;

a device pattern surface of a lower semiconductor device faces a non-device pattern surface of a semiconductor device stacked on the lower semiconductor device;

the semiconductor device positioned, in sequence, as lowermost semiconductor device further comprises a back surface protective film and a heat radiation layer, of a material having a high heat transfer rate, on the non-device pattern surface of the lowermost semiconductor device.

Note that the term “obtained by collectively fabricating a plurality of semiconductor packages on a wafer in a batch process producing a wafer product and dicing the wafer product into discrete semiconductor packages” is method recitation in a device claimed. “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Regarding claim 3, Tsai et al. discloses the heat radiation layer is one deposited on the non-device pattern surface of a wafer as the lowermost layer. Note that the term “before said semiconductor packages are diced” is method recitation in a device claimed.

Regarding claim 4, Tsai et al. discloses the heat radiation layer is one of a thin film. Note that the term “formed by a thin film formation technology” is method recitation in a device claimed.

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Regarding claim 5, Tsai et al. discloses the heat radiation layer is made of copper, aluminum or an alloy.

Regarding claim 6, Tsai et al. discloses the heat radiation layer also acts as a support.

Regarding claim 7, Tsai et al. discloses the insulating layer comprises a polyimide resin or an epoxy resin.

Regarding claim 8, Tsai et al. discloses the semiconductor device positioned as the uppermost layer further comprises a resin sealing layer on the device pattern surface thereof, and the resin sealing layer is one formed on the device pattern surface of the wafer as the uppermost layer.

Note that the term “before said semiconductor package is dice” is method recitation in a device claimed.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 3-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu (PN 5,627,106) in view of Palm et al. (US 2004/0056346).

Hsu discloses, as shown in Figure 12, a semiconductor package, wherein

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the semiconductor package is a stacked body formed by bonding two or more semiconductor devices (40,10) through an insulating layer (30,50);

each of the semiconductor device comprising a substrate and a device pattern formed on a surface thereof;

a device pattern surface of a lower semiconductor device faces a non-device pattern surface of a semiconductor device stacked on the lower semiconductor device.

Hsu does not disclose the semiconductor device (40) positioned, in sequence, as lowermost semiconductor device further comprises a back surface protective film and a heat radiation layer, of a material having a high heat transfer rate, on the non-device pattern surface of the lowermost semiconductor device.

However, Palm et al. discloses a semiconductor device comprises a back surface protective film (7) and a heat radiation layer (6), of a material having a high heat transfer rate, on the non-device pattern surface of the lowermost semiconductor device. Note Figures 1-2 of Palm et al..

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the semiconductor device of Hsu having a back surface protective film and a heat radiation layer on the non-device pattern surface on the semiconductor device, such as taught by Palm et al. in order to reduce the heat build-up from the semiconductor device.

Note that the term “obtained by collectively fabricating a plurality of semiconductor packages on a wafer in a batch process producing a wafer product and dicing the wafer product into discrete semiconductor packages” is method recitation in a device claimed. “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of

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production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.” *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

Regarding claim 3, Hsu and Palm et al. disclose the heat radiation layer is one deposited on the non-device pattern surface of a wafer as the lowermost layer. Note that the term “before said semiconductor packages are diced” is method recitation in a device claimed.

Regarding claim 4, Hsu and Palm et al. disclose the heat radiation layer is one of a thin film. Note that the term “formed by a thin film formation technology” is method recitation in a device claimed.

Regarding claim 5, Hsu and Palm et al. disclose the heat radiation layer is made of copper, aluminum or an alloy.

Regarding claim 6, Hsu and Palm et al. disclose the heat radiation layer also acts as a support.

Regarding claim 7, Hsu and Palm et al. disclose the insulating layer comprises a polyimide resin or an epoxy resin.

Regarding claim 8, Hsu and Palm et al. disclose the semiconductor device positioned as the uppermost layer further comprises a resin sealing layer (27) on the device pattern surface thereof,

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and the resin sealing layer is one formed on the device pattern surface of the wafer as the uppermost layer. Note that the term “before said semiconductor package is dice” is method recitation in a device claimed.

Regarding claim 9, Hsu and Palm et al. disclose the device patterns of the semiconductor devices stacked are electrically connected to one another through a rewiring layer and a substrate through-electrode (VK) that formed in one semiconductor device. Note that the term “are simultaneously formed in one semiconductor device” is method recitation in a device claimed.

Regarding claim 10, Hsu and Palm et al. disclose all of the claimed limitations except material of the re-wiring layer and the substrate through-electrode. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the re-wiring layer and the substrate through-electrode of Hsu and Palm et al. having the materials as that claimed by Applicant, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Response to Arguments

4. Applicant's arguments filed 04/17/06 have been fully considered but they are not persuasive.

It is argued that Tsai et al. does not disclose a back surface protective film on the semiconductor package and a heat radiation layer is formed on the protection film. This argument is not

convincing because Tsai et al. discloses, as shown in Figures 2-3, a back surface protective film (26) on the semiconductor package and a heat radiation layer (27) is formed on the protection film.

5. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung Vu whose telephone number is (571) 272-1666. The examiner can normally be reached on Tuesday to Friday 6:00-4:30.

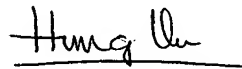
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (571) 272 - 1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Vu

July 6, 2006

A handwritten signature in black ink, appearing to read 'Hung Vu', written over a horizontal line.

Hung Vu

Primary Examiner